(19)日本国特許庁（ＪＰ）　(12)公開特許公報（A）　(11)特許出願公開番号
特開2001－80111
（P2001－80111A）
(43)公開日　平成13年３月27日(2001.3.27)

(51)Int.Cl.'		識別記号	FI		テーマコード(参考)	
B41J	2/44		B41J	3/21	L	2C162
	2/45		H04N	1/036	A	5C051
	2/455					
H04N	1/036					

審査請求　未請求　請求項の数９　ＯＬ　（全９頁）

(21)出願番号　特願平11－256990

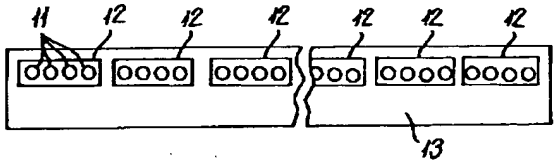
(22)出願日　平成11年９月10日(1999.9.10)

(71)出願人　000006747
株式会社リコー
東京都大田区中馬込１丁目３番６号
(72)発明者　石井　哲一
埼玉県八潮市大字鶴ケ曽根713・リコーユニテクノ株式会社内
(74)代理人　100067873
弁理士　樺山　亨　（外１名）

Ｆターム(参考)　2C162 AE47 AF04 AF20 AF24 AF70 FA17
5C051 AA02 CA08 DA03 DA09 DB29 DC05 DC07 DE07 DE30

(54)【発明の名称】　光書込み装置

(57)【要約】
【課題】　この発明は、ＬＥＤヘッドのチップ継ぎ目部分により白スジが発生するという課題を解決しようとするものである。
【解決手段】　この発明は、複数個の発光素子１１のアレーを１チップ１２とし、一列に配列された複数個のチップ１２を有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、チップ１２の端部の発光素子１１の光量を該端部以外の発光素子１１の光量より発光素子１１の印加電流値で２～６％増加させたものである。



1

【特許請求の範囲】

【請求項1】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたことを特徴とする光書込み装置。

【請求項2】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたことを特徴とする光書込み装置。

【請求項3】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記チップの前記発光素子の光量を前記チップの端部に向けて徐々に増加させ、該端部における前記発光素子の光量を前記チップの内部における前記発光素子の光量に比べて前記発光素子の印加電流値で2～6%増加させたことを特徴とする光書込み装置。

【請求項4】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたことを特徴とする光書込み装置。

【請求項5】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたことを特徴とする光書込み装置。

【請求項6】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップの端部に向けて前記発光素子の光量を徐々に増加させ、該端部における前記発光素子の光量を前記チップの内部における前記発光素子の光量に比べて前記発光素子の印加電流値で2～6%増加させたことを特徴とする光書込み装置。

【請求項7】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査

2

型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上69μm未満である箇所における前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で2%増加させ、前記複数個のチップの継ぎ目部の発光素子ピッチが69μm以上である箇所における前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で4%増加させたことを特徴とする光書込み装置。

【請求項8】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上69μm未満である箇所における前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で2%増加させ、前記複数個のチップの継ぎ目部の発光素子ピッチが69μm以上である箇所における前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で4%増加させたことを特徴とする光書込み装置。

【請求項9】複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上69μm未満である箇所における前記チップの端部に向けて前記発光素子の光量を徐々に増加させ、該端部における前記発光素子の光量を前記チップの内部における前記発光素子の光量に比べて前記発光素子の印加電流値で2%増加させるとともに、前記複数個のチップの継ぎ目部の発光素子ピッチが69μm以上である箇所らおける前記チップの端部に向けて前記発光素子の光量を徐々に増加させ、該端部の発光素子の光量を前記チップの内部における前記発光素子の光量より前記発光素子の印加電流値で4%増加させたことを特徴とする光書込み装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は複写機、ファクシミリ、プリンタなどに用いられる光書込み装置に関する。

【0002】

【従来の技術】光書き込み装置は、複写機、ファクシミリ、プリンタなどに用いられ、LEDヘッドなどの固体走査型光プリントヘッドにより画像データに基づき感光体に光書込みを行っている。LEDヘッドは、図8に示すように複数個のLED素子1を一列に配列したLEDアレーを1つのチップ2とし、複数個のチップ2をメイン基板3に一列に配列した構成となっている。

3

【0003】しかし、このLEDヘッドでは、設備上の問題などにより、チップ2内の各LED素子1のピッチは精度良く製造できるのに対して、各チップ2の継ぎ目部におけるLED素子1のピッチは公差が広くなってしまうのが現状である。つまり、チップ2内部のLED素子ピッチよりも各チップ2間におけるLED素子ピッチの方が広くなってしまう。

【0004】A0幅400dpiのLEDヘッドに関して言えば、128個のLED素子1のアレーを1チップ2として基板3上に113個のチップ2がマウントされている。つまり、LEDヘッドは128×113＝14464個のLED素子1のアレーから構成される。また、各LED素子1のピッチは25．4mm÷400＝63．5μmである。図9に示すようにLEDヘッドの製造工程において設備上から各LED素子1のピッチの公差がチップ2の内部では63．5±5μm、各チップ2の継ぎ目部分では63．5±10μmである。

【0005】多値の画像データによりLEDヘッドで中間調画像の光書込みを行う光書込み装置では、画像データによりLED素子1の発光デューティ（発光時間）を制御して画像の中間調を表現していた。ところが、LED素子1の発光デューティを小さくすると、図10に示すように、LED素子1からの光束による感光体上のスポットの径が小さくなり、上述のように各チップ2の継ぎ目部におけるLED素子1のピッチが広いことより画像は各チップ2の継ぎ目部に対応する部分に白スジが発生してしまう。そこで、従来の光書込み装置では、LEDヘッドの各チップ2の継ぎ目部におけるLED素子1のピッチを各チップ2の継ぎ目部以外の各LED素子1のピッチに対して多少小さくし、白スジの発生頻度を下げてきた。

【0006】

【発明が解決しようとする課題】従来の光書込み装置では、LEDヘッドの各チップ2の継ぎ目部におけるLED素子1のピッチを狙いのピッチよりも小さくしているが、その公差が大きいため、白スジの発生頻度を下げるのが精一杯であり、白スジの発生を無くすことができなかった。

【0007】つまり、各チップ2の継ぎ目部分におけるLED素子ピッチの寸法は、±10μmの公差に対してほとんどが+側に出来上がり、画像はLEDヘッドにおけるLED素子ピッチが大きい個所に対応する中間調の部分に白スジが発生してしまう。この白スジ対策は、各チップ2の継ぎ目部分におけるLED素子ピッチを狙いの63．5μmから61．5μmのように最初からLED素子ピッチが広がることを見越して狭くしている。しかし、この白スジ対策では、主走査方向の変倍率が小さくなって100%にならない。また、各チップ2の継ぎ目部分におけるLED素子ピッチの公差が±10μmもあるため、完全に白スジを削除することは不可能であり、白スジ発生頻度を低減するのが精一杯である。

4

【0008】本発明は、光プリントヘッドのチップ継ぎ目部による白スジの発生を解消することができる光書込み装置を提供することを目的とする。

【0009】

【課題を解決するための手段】上記目的を達成するため、請求項1に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたものである。

【0010】請求項2に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたものである。

【0011】請求項3に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記チップの前記発光素子の光量を前記チップの端部に向けて徐々に増加させ、該端部における前記発光素子の光量を前記チップの内部における前記発光素子の光量に比べて前記発光素子の印加電流値で2～6%増加させたものである。

【0012】請求項4に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたものである。

【0013】請求項5に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で2～6%増加させたものである。

【0014】請求項6に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップの端部に向けて前記発光素子の光量を徐々に増加させ、該端部における前記発光素子の光量を

5

前記チップの内部における前記発光素子の光量に比べて前記発光素子の印加電流値で2～6%増加させたものである。

【0015】請求項7に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上69μm未満である箇所における前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で2%増加させ、前記複数個のチップの継ぎ目部の発光素子ピッチが69μm以上である箇所における前記チップの端部の発光素子の光量を該端部以外の発光素子の光量より前記発光素子の印加電流値で4%増加させたものである。

【0016】請求項8に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上69μm未満である箇所における前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で2%増加させ、前記複数個のチップの継ぎ目部の発光素子ピッチが69μm以上である箇所における前記チップの端部及びその近傍の発光素子の光量を該端部及びその近傍以外の発光素子の光量より前記発光素子の印加電流値で4%増加させたものである。

【0017】請求項9に係る発明は、複数個の発光素子のアレーを1チップとし、一列に配列された複数個のチップを有する固体走査型光プリントヘッドにより光書込みを行う光書込み装置において、前記複数個のチップの継ぎ目部の発光素子ピッチが66μm以上69μm未満である箇所における前記チップの端部に向けて前記発光素子の光量を徐々に増加させ、該端部における前記発光素子の光量を前記チップの内部における前記発光素子の光量に比べて前記発光素子の印加電流値で2%増加させるとともに、前記複数個のチップの継ぎ目部の発光素子ピッチが69μm以上である箇所における前記チップの端部に向けて前記発光素子の光量を徐々に増加させ、該端部の発光素子の光量を前記チップの内部における前記発光素子の光量より前記発光素子の印加電流値で4%増加させたものである。

【0018】

【発明の実施の形態】本発明の実施例1は、請求項1に係る発明の一実施例であり、複写機、ファクシミリ、プリンタなどに用いられて、固体走査型光プリントヘッドとしてのLEDヘッドにより感光体に画像データに基づき光書込みを行う光書込み装置の例である。LEDヘッドは、図1に示すように複数個の発光素子としてのLED素子11を一列に配列したLEDアレーを1つのチップ12とし、このようなチップ12を複数個、LED素子11が主走査方向へ一列に配列されるようにメイン基板13に一列に配列した構成となっている。このLEDヘッドは、例えば128個のLED素子11のアレーを1チップ12として基板13上に113個のチップ12がマウントされ、各LED素子11のピッチは63.5μmである。

【0019】図5に示すように、このLEDヘッドにおける各チップ12のLED素子11のアレー16は、ドライバ15にて多値の画像データによりLED素子11の発光デューティ（発光時間）が制御されるように駆動されて発光し、多値の画像データにより変調された光束を感光体の一様帯電面へ照射して中間調画像を感光体に書き込む。ドライバ15はメイン基板13に含まれている。

【0020】この実施例1の光書込み装置においては、LEDヘッドの各LED素子11からの光束による感光体上のスポットの径は各LED素子11の発光量に比例することから、LEDヘッドのLEDピッチが広い箇所（各チップの継ぎ目部分）のLED素子11の発光量を他のLED素子11の発光量に比べて大きくすれば、図6に示すように、LEDヘッドのLEDピッチが広い箇所（各チップの継ぎ目部分）のLED素子からの光束による感光体上のスポットS1の径が他のLED素子からの光束による感光体上のスポットS2の径に比べて大きくなり、感光体上の各スポットS1、S2の隙間をつぶすことが可能である。

【0021】そこで、実施例1では、各チップ12の継ぎ目部分により発生する白スジを削除するため、図2に示すように、全てのチップ12において両端のみのLED素子11へドライバ15から印加される電流の値を両端のLED素子11以外のLED素子11へドライバ15から印加される電流の値に比べて2～6%増加させることによって、両端のLED素子11の発光量P1を両端のLED素子11以外のLED素子11の発光量P2に比べて2～6%上げることで、両端のLED素子11からの光束による感光体上のスポットの径を両端のLED以外のLED素子11からの光束による感光体上のスポットの径より大きくして白スジの発生を防止するようにドライバ15からLEDヘッドの各LED素子11への駆動電流を設定した。ここに、ドライバ15から各チップ12の両端のLED素子11以外のLED素子11への駆動電流は一定値に設定した。

【0022】ここに、ドライバ15からLED素子11への駆動電流の設定は周知の電流調整手段が用いられる。例えば、基板13はドライバ15からLEDヘッドの各LED素子11への駆動電流を各入力端子の信号レベルに応じて個別に調整する周知の電流調整手段を有し、この電流調整手段の各入力端子の信号レベルを調整

6

して、各チップ１２において両端のみのＬＥＤ素子１１へドライバ１５から印加される電流の値を両端のＬＥＤ素子１１以外のＬＥＤ素子１１へドライバ１５から印加される電流の値に比べて２～６％増加させるように調整した。

【００２３】両端のＬＥＤ素子１１への印加電流値を２～６％上げた理由は、両端のＬＥＤ素子１１への印加電流値を６％よりも大きくすると、図7示すように両端のＬＥＤ素子１１からの光束による感光体上のスポットＳ１の交差部分が大きくなり、その光量が大きくなるため、画像に黒スジが発生してしまう（感光体上の電位が狙いの値以上に下がってしまう）からであり、また、両端のＬＥＤ素子１１への印加電流値を２％未満上げても白スジが削除されないからである。

【００２４】この実施例１によれば、複数個の発光素子としてのＬＥＤ素子１１のアレーを１チップ１２とし、一列に配列された複数個のチップ１２を有する固体走査型光プリントヘッドとしてのＬＥＤヘッドにより光書込みを行う光書込み装置において、前記チップ１２の端部の発光素子１１の光量を該端部以外の発光素子１１の光量より前記発光素子１１の印加電流値で２～６％増加させたので、光プリントヘッドとしてのＬＥＤヘッドのチップ継ぎ目部による白スジの発生を解消することができる。

【００２５】本発明の実施例２は、請求項２に係る発明の一実施例である。この実施例２では、上記実施例１において、チップ１２の両端のみのような局部的な光量増加による濃度ムラをなくすため、図３に示すように、全てのチップ１２において両端及びその近傍のみのＬＥＤ素子１１へドライバ１５から印加される電流の値を両端及びその近傍のＬＥＤ素子１１以外のＬＥＤ素子１１へドライバ１５から印加される電流の値に比べて２～６％増加させることによって、両端及びその近傍のＬＥＤ素子１１の発光量Ｐ１を両端及びその近傍のＬＥＤ素子１１以外のＬＥＤ素子１１の発光量Ｐ２に比べて２～６％上げることで、両端及びその近傍のＬＥＤ素子１１からの光束による感光体上のスポットの径を両端及びその近傍のＬＥＤ素子１１以外のＬＥＤ素子１１からの光束による感光体上のスポットの径より大きくするようにドライバ１５からＬＥＤヘッドの各ＬＥＤ素子１１への駆動電流を上記電流調整手段の各入力端子の信号レベル調整により設定した。

【００２６】この実施例２によれば、複数個の発光素子としてのＬＥＤ素子１１のアレーを１チップ１２とし、一列に配列された複数個のチップ１２を有する固体走査型光プリントヘッドとしてのＬＥＤヘッドにより光書込みを行う光書込み装置において、前記チップ１２の端部及びその近傍の発光素子１１の光量を該端部及びその近傍以外の発光素子１１の光量より前記発光素子１１の印加電流値で２～６％増加させたので、光プリントヘッドとしてのＬＥＤヘッドのチップ継ぎ目部による白スジの発生を解消することができ、更に局部的な光量増加による濃度ムラをなくすことができる。

【００２７】本発明の実施例３は、請求項３に係る発明の一実施例である。この実施例３では、上記実施例１において、チップ１２の両端のみのような局部的な光量増加による濃度ムラをなくすため、図４に示すように、全てのチップ１２においてＬＥＤ素子１１へドライバ１５から印加される電流の値を両端に向けて徐々に増加させ、両端のＬＥＤ素子１１へドライバ１５から印加される電流の値をチップ１２の中間のＬＥＤ素子１１（印加電流値を増加させないＬＥＤ）へドライバ１５から印加される電流の値に比べて２～６％増加させることにより、両端に向けてＬＥＤ素子１１の発光量Ｐ１、Ｐ2、Ｐ3を徐々に増加させ、両端のＬＥＤ素子１１の発光量をチップ１２の中間のＬＥＤ素子１１（印加電流値を増加させないＬＥＤ）の発光量Ｐ２に比べて２～６％上げるようにドライバ１５からＬＥＤヘッドの各ＬＥＤ素子１１への駆動電流を上記電流調整手段の各入力端子の信号レベル調整により設定した。

【００２８】この実施例３によれば、複数個の発光素子としてのＬＥＤ素子１１のアレーを１チップ１２とし、一列に配列された複数個のチップ１２を有する固体走査型光プリントヘッドとしてのＬＥＤヘッドにより光書込みを行う光書込み装置において、前記チップ１２の前記発光素子１１の光量を前記チップ１２の端部に向けて徐々に増加させ、該端部における前記発光素子１１の光量を前記チップ１２の内部における前記発光素子１１の光量に比べて前記発光素子１１の印加電流値で２～６％増加させたので、光プリントヘッドとしてのＬＥＤヘッドのチップ継ぎ目部による白スジの発生を解消することができ、更に局部的な光量増加による濃度ムラをなくすことができる。

【００２９】上記実施例１～実施例３では、各チップ１２の継ぎ目部分におけるＬＥＤ素子１１の発光量を印加電流値で２～６％上げても、ＬＥＤピッチが６６μm以上である箇所のみにおいて黒スジが発生することが確認された。そこで、請求項４に係る発明の一実施例である本発明の実施例４では、上記実施例１において、黒スジの発生を防止するため、各チップ１２の継ぎ目部分におけるＬＥＤピッチが６６μm以上ある箇所のチップ１２の端部におけるＬＥＤ素子１１へドライバ１５から印加される電流の値を該端部のＬＥＤ素子１１以外のＬＥＤ素子１１へドライバ１５から印加される電流の値に比べて２～６％増加させることにより、ＬＥＤピッチが６６μm以上ある箇所におけるチップ１２の端部のＬＥＤ素子１１の発光量Ｐ１を該端部のＬＥＤ素子１１以外のＬＥＤ素子１１の発光量Ｐ２に比べて２～６％上げるようにドライバ１５からＬＥＤヘッドの各ＬＥＤ素子１１への駆動電流を上記電流調整手段の各入力端子の信号レベ

ル調整により設定した。

【0030】この実施例4によれば、複数個の発光素子としてのLED素子11のアレーを1チップ12とし、一列に配列された複数個のチップ12を有する固体走査型光プリントヘッドとしてのLEDヘッドにより光書込みを行う光書込み装置において、前記複数個のチップ12の継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップ12の端部の発光素子11の光量を該端部以外の発光素子11の光量より前記発光素子11の印加電流値で2～6%増加させたので、光プリントヘッドとしてのLEDヘッドのチップ継ぎ目部による白スジの発生を解消することができ、更に黒スジの発生を防止することができる。

【0031】請求項5に係る発明の一実施例である本発明の実施例5では、上記実施例2において、黒スジの発生を防止するため、各チップ12の継ぎ目部分におけるLEDピッチが66μm以上ある箇所のチップ12の端部及びその近傍におけるLED素子11へドライバ15から印加される電流の値を該端部及びその近傍のLED以外のLED素子11へドライバ15から印加される電流の値に比べて2～6%増加させることにより、LEDピッチが66μm以上ある箇所におけるチップ12の端部及びその近傍のLED素子11の発光量P1を該端部及びその近傍のLED素子11以外のLED素子11の発光量P2に比べて2～6%上げるようにドライバ15からLEDヘッドの各LED素子11への駆動電流を上記電流調整手段の各入力端子の信号レベル調整により設定した。

【0032】この実施例5によれば、複数個の発光素子としてのLED素子11のアレーを1チップ12とし、一列に配列された複数個のチップ12を有する固体走査型光プリントヘッドとしてのLEDヘッドにより光書込みを行う光書込み装置において、前記複数個のチップ12の継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップ12の端部及びその近傍の発光素子11の光量を該端部及びその近傍以外の発光素子11の光量より前記発光素子11の印加電流値で2～6%増加させたので、光プリントヘッドとしてのLEDヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、更に黒スジの発生を防止することができる。

【0033】請求項6に係る発明の一実施例である本発明の実施例6では、上記実施例3において、黒スジの発生を防止するため、各チップ12の継ぎ目部分におけるLEDピッチが66μm以上ある箇所におけるチップ12の端部に向けて該チップ12のLED素子11へドライバ15から印加される電流の値を徐々に増加させ、該端部のLED素子11へドライバ15から印加される電流の値をチップ12の中間のLED素子11（電流値を増加させないLED）へドライバ15から印加される電流の値に比べて2～6%増加させることによって、LEDピッチが66μm以上ある箇所におけるチップ12の端部に向けて該チップ12のLED素子11の発光量を徐々に増加させ、該端部のLED素子11の発光量P1をチップ12の中間のLED素子11（電流値を増加させないLED）の発光量P2に比べて2～6%上げるようにドライバ15からLEDヘッドの各LED素子11への駆動電流を上記電流調整手段の各入力端子の信号レベル調整により設定した。

【0034】この実施例6によれば、複数個の発光素子としてのLED素子11のアレーを1チップ12とし、一列に配列された複数個のチップ12を有する固体走査型光プリントヘッドとしてのLEDヘッドにより光書込みを行う光書込み装置において、前記複数個のチップ12の継ぎ目部の発光素子ピッチが66μm以上である箇所における前記チップ12の端部に向けて前記発光素子11の光量を徐々に増加させ、該端部における前記発光素子11の光量を前記チップ12の内部における前記発光素子11の光量に比べて前記発光素子11の印加電流値で2～6%増加させたので、光プリントヘッドとしてのLEDヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、更に黒スジの発生を防止することができる。

【0035】請求項7に係る発明の一実施例である本発明の実施例7では、上記実施例1において、白スジが発生する、各チップ12の継ぎ目部分におけるLEDピッチが66μm以上ある箇所において、さらに各チップ12の継ぎ目部分におけるLEDピッチを細かく分解し、白スジがうっすらと発生する、各チップ12の継ぎ目部分におけるLEDピッチが66μmから69μm未満である箇所におけるチップ12の端部のLED素子11の光量を該端部のLED素子11以外のLED素子11の光量よりLED素子11の印加電流値で2%増加させるとともに、白スジが目立つ、各チップ12の継ぎ目部分におけるLEDピッチが69μm以上である箇所におけるチップ12の端部のLED素子11の光量を該端部のLED素子11以外のLED素子11の光量よりLED素子11の印加電流値で4%増加させるようにドライバ15からLEDヘッドの各LED素子11への駆動電流を上記電流調整手段の各入力端子の信号レベル調整により設定した。

【0036】この実施例7によれば、複数個の発光素子としてのLED素子11のアレーを1チップ12とし、一列に配列された複数個のチップ12を有する固体走査型光プリントヘッドとしてのLEDヘッドにより光書込みを行う光書込み装置において、前記複数個のチップ12の継ぎ目部の発光素子ピッチが66μm以上69μm未満である箇所における前記チップ12の端部の発光素

子１１の光量を該端部以外の発光素子１１の光量より前記発光素子１１の印加電流値で２％増加させ、前記複数個のチップ１２の継ぎ目部の発光素子ピッチが６９μｍ以上である箇所における前記チップ１２の端部の発光素子１１の光量を該端部以外の発光素子１１の光量より前記発光素子１１の印加電流値で４％増加させたので、光プリントヘッドとしてのＬＥＤヘッドのチップ継ぎ目部による白スジの発生を解消することができ、より濃度ムラの少ない画像を提供できる。

【００３７】請求項８に係る発明の一実施例である本発明の実施例８では、上記実施例２において、実施例７と同様に白スジが発生する、各チップ１２の継ぎ目部分におけるＬＥＤピッチが６６μｍ以上である箇所において、各チップ１２の継ぎ目部分におけるＬＥＤピッチを細かく分解し、白スジがうっすらと発生する、各チップ１２の継ぎ目部分におけるＬＥＤピッチが６６μｍから６９μｍ未満である箇所におけるチップ１２の端部及びその近傍のＬＥＤ素子１１の光量を該端部及びその近傍のＬＥＤ素子１１以外のＬＥＤ素子１１の光量よりもＬＥＤ素子１１の印加電流値で２％増加させるとともに、白スジが目立つ、各チップ１２の継ぎ目部分におけるＬＥＤピッチが６９μｍ以上である箇所におけるチップ１２の端部及びその近傍のＬＥＤ素子１１の光量を該端部及びその近傍のＬＥＤ素子１１以外のＬＥＤ素子１１の光量よりもＬＥＤ素子１１の印加電流値で４％増加させるようにドライバ１５からＬＥＤヘッドの各ＬＥＤ素子１１への駆動電流を上記電流調整手段の各入力端子の信号レベル調整により設定した。

【００３８】この実施例８によれば、複数個の発光素子としてのＬＥＤ素子１１のアレーを１チップ１２とし、一列に配列された複数個のチップ１２を有する固体走査型光プリントヘッドとしてのＬＥＤヘッドにより光書込みを行う光書込み装置において、前記複数個のチップ１２の継ぎ目部の発光素子ピッチが６６μｍ以上６９μｍ未満である箇所における前記チップ１２の端部及びその近傍の発光素子１２の光量を該端部及びその近傍以外の発光素子１２の光量より前記発光素子１２の印加電流値で２％増加させ、前記複数個のチップ１２の継ぎ目部の発光素子ピッチが６９μｍ以上である箇所における前記チップ１２の端部及びその近傍の発光素子１１の光量を該端部及びその近傍以外の発光素子１１の光量より前記発光素子１１の印加電流値で４％増加させたので、光プリントヘッドとしてのＬＥＤヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、より濃度ムラの少ない画像を提供できる。

【００３９】請求項９に係る発明の一実施例である本発明の実施例９では、上記実施例３において、実施例７と同様に白スジが発生する、各チップ１２の継ぎ目部分におけるＬＥＤピッチが６６μｍ以上ある箇所において、さらに各チップ１２の継ぎ目部分におけるＬＥＤピッチを細かく分解し、白スジがうっすらと発生する、各チップ１２の継ぎ目部分におけるＬＥＤピッチが６６μｍから６９μｍ未満である箇所におけるチップ１２の端部に向けて該チップ１２におけるＬＥＤ素子１１の光量を徐々に増加させ、該端部におけるＬＥＤ素子１１の光量をチップ１２の内部におけるＬＥＤ素子１１（光量を増加せないＬＥＤ）の光量に比べてＬＥＤ素子１１の印加電流値で２％増加させるとともに、白スジが目立つ、各チップ１２の継ぎ目部分におけるＬＥＤピッチが６９μｍ以上である箇所におけるチップ１２の端部に向けて該チップ１２におけるＬＥＤ素子１１の光量を徐々に増加させ、該端部におけるＬＥＤ素子１１の光量をチップ１２の内部におけるＬＥＤ素子１１（光量を増加せないＬＥＤ）の光量に比べてＬＥＤ素子１１の印加電流値で４％増加させるようにドライバ１５からＬＥＤヘッドの各ＬＥＤ素子１１への駆動電流を上記電流調整手段の各入力端子の信号レベル調整により設定した。

【００４０】この実施例９によれば、複数個の発光素子としてのＬＥＤ素子１１のアレーを１チップ１２とし、一列に配列された複数個のチップ１２を有する固体走査型光プリントヘッドとしてのＬＥＤヘッドにより光書込みを行う光書込み装置において、前記複数個のチップ１２の継ぎ目部の発光素子ピッチが６６μｍ以上６９μｍ未満である箇所における前記チップ１２の端部に向けて前記発光素子１１の光量を徐々に増加させ、該端部では前記発光素子１１の光量を前記チップ１２の内部における前記発光素子１１の光量に比べて前記発光素子１１の印加電流値で２％増加させるとともに、前記複数個のチップ１２の継ぎ目部の発光素子ピッチが６９μｍ以上である箇所における前記チップ１２の端部に向けて前記発光素子１１の光量を徐々に増加させ、該端部の発光素子１１の光量を前記チップ１２の内部における前記発光素子１１の光量より前記発光素子１１の印加電流値で４％増加させたので、光プリントヘッドとしてのＬＥＤヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、より濃度ムラの少ない画像を提供できる。

【００４１】なお、本発明は、上記実施例に限定されるものではなく、ＬＥＤヘッド以外の固体走査型光プリントヘッドを有する光書込み装置にも適用することができる。

【００４２】

【発明の効果】以上のように請求項１に係る発明によれば、光プリントヘッドのチップ継ぎ目部による白スジの発生を解消することができる。請求項２に係る発明によれば、光プリントヘッドのチップ継ぎ目部による白スジの発生を解消することができ、更に局部的な光量増加による濃度ムラをなくすことができる。

13

【0043】請求項3に係る発明によれば、光プリントヘッドのチップ継ぎ目部による白スジの発生を解消することができ、更に局部的な光量増加による濃度ムラをなくすことができる。請求項4に係る発明によれば、光プリントヘッドのチップ継ぎ目部による白スジの発生を解消することができ、更に黒スジの発生を防止することができる。

【0044】請求項5に係る発明によれば、光プリントヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、更に黒スジの発生を防止することができる。請求項6に係る発明によれば、光プリントヘッドとしてのLEDヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、更に黒スジの発生を防止することができる。

【0045】請求項7に係る発明によれば、光プリントヘッドのチップ継ぎ目部による白スジの発生を解消することができ、より濃度ムラの少ない画像を提供できる。請求項8に係る発明によれば、光プリントヘッドとしてのLEDヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、より濃度ムラの少ない画像を提供できる。

【0046】請求項9に係る発明によれば、光プリントヘッドとしてのLEDヘッドのチップ継ぎ目部による白スジの発生を解消することができ、しかも局部的な光量増加による濃度ムラをなくすことができ、より濃度ムラの少ない画像を提供できる。

14

【図面の簡単な説明】

【図1】本発明の実施例1のLEDヘッドを示す概略図である。

【図2】同実施例1におけるLEDとその印加電流値との関係を示す図である。

【図3】本発明の実施例2におけるLEDとその印加電流値との関係を示す図である。

【図4】発明の実施例3におけるLEDとその印加電流値との関係を示す図である。

【図5】上記実施例1のLEDアレー及びドライバを示すブロック図である。

【図6】上記実施例1による感光体上のスポットを示す図である。

【図7】上記実施例を説明するための図である。

【図8】従来のLEDヘッドを示す概略図である。

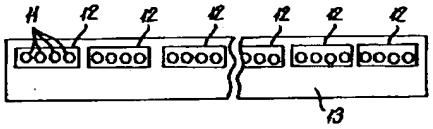
【図9】同LEDヘッドのLEDピッチを示す図である。

【図10】同LEDヘッドのチップ継ぎ目部分により発生する白スジを説明するための図である。

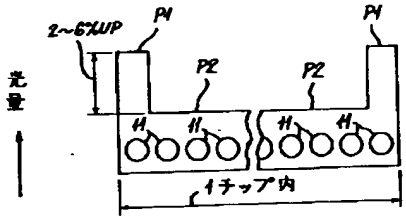
【符号の説明】

11　LED
12　チップ
15　ドライバ

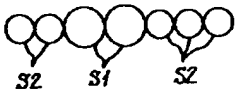
【図1】



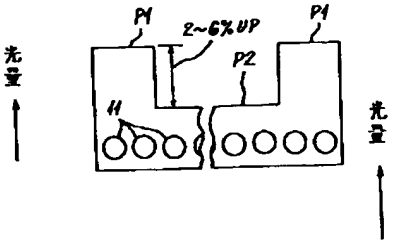
【図2】



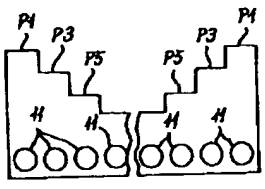
【図6】



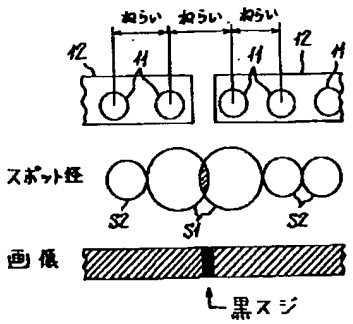
【図3】



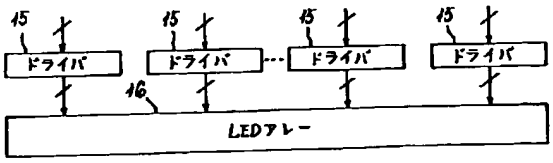
【図4】



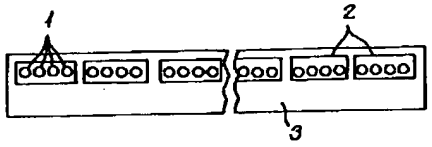
【図7】



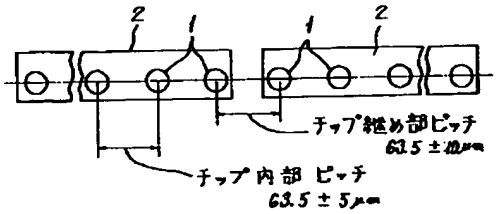
【図5】


15
15
15
15
ドライバ
ドライバ
ドライバ
ドライバ
16
LEDアレー

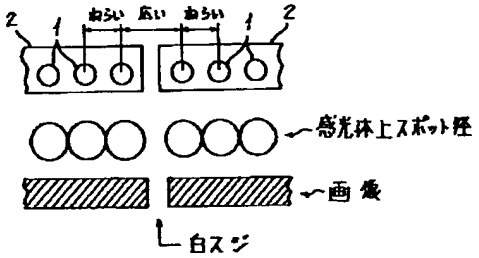
【図8】


1
2
3

【図9】


2
1
1
2
チップ組め部ピッチ
63.5 ±10μm
チップ内部ピッチ
63.5 ± 5μm

【図10】


2
1
狭い
広い
狭い
1
2
感光体上スポット径
画像
白スジ

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-080111

(43)Date of publication of application : 27.03.2001

(51)Int.Cl. B41J 2/44
B41J 2/45
B41J 2/455
H04N 1/036

(21)Application number : 11-256990

(22)Date of filing : 10.09.1999

(71)Applicant : RICOH CO LTD

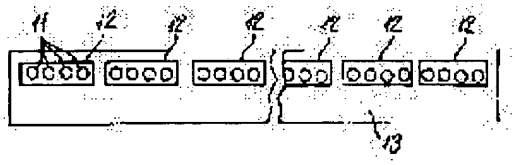
(72)Inventor : ISHII TETSUKAZU

(54) OPTICAL WRITING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent a white stripe which may occur at a connection section of chips in an LED head.

SOLUTION: There is disclosed an optical writing device wherein optically writing is executed by means of a solid scanning type optical print head having a plurality of chips 12 arranged in a line, each of the chips 12 including an array of a plurality of light emitting elements 11 formed therein. A light quantity of the light emitting element 11 at the end of the chip 12 is set to be more than those of the other elements by increasing a current value to be applied to the light emitting element 11 by 2-6%.



LEGAL STATUS

[Date of request for examination] 18.03.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or

application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] Equipment write-in [optical] which considers the array of two or more light emitting devices as one chip, and is characterized by making the quantity of light of the light emitting device of the edge of said chip increase from the quantity of light of light emitting devices other than this edge by 2 to 6% with the force current value of said light emitting device in the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips arranged by the single tier.
[Claim 2] Equipment write-in [optical] which considers the array of two or more light emitting devices as one chip, and is characterized by making the quantity of light of the edge of said chip, and the light emitting device of the near increase from the quantity of light of light emitting devices other than this edge and its near by 2 to 6% with the force current value of said light emitting device in the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips arranged by the single tier.
[Claim 3] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which considered the array of two or more light emitting devices as one chip, and were arranged by the single tier Equipment write-in [optical] characterized by having turned the quantity of light of said light emitting device of said chip to the edge of said chip, having made it increase gradually, and making the quantity of light of said light emitting device in this edge increase by 2 to 6% with the force current value of said light emitting device compared with the quantity of light of said light emitting device in the interior of said chip.
[Claim 4] The equipment write-in [optical] which considers the array of two or more light emitting devices as one chip, and is characterized by to make the quantity of light of the light emitting device of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 66 micrometers or more increase by 2 to 6% with the force current value of said light emitting device from the quantity of light of light emitting devices other than this edge in the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips arranged by the single tier.
[Claim 5] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which considered the array of two or more light emitting devices as one chip, and were arranged by the single tier Equipment write-in [optical] characterized by making the quantity of light of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 66 micrometers or more, and the light emitting device of the near increase from the quantity of light of light emitting devices other than this edge and its near by 2 to 6% with the force current value of said light emitting device.
[Claim 6] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The quantity of light of said light emitting device is made to increase gradually towards the edge of said chip in the part whose light

emitting device pitch of the joint section of two or more of said chips is 66 micrometers or more. Equipment write-in [optical] characterized by making the quantity of light of said light emitting device in this edge increase by 2 to 6% with the force current value of said light emitting device compared with the quantity of light of said light emitting device in the interior of said chip.

[Claim 7] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips makes the quantity of light of the light emitting device of the edge of said chip in 66-micrometer or more part where it is less than 69 micrometers increase from the quantity of light of light emitting devices other than this edge by 2% with the force current value of said light emitting device. Equipment write-in [optical] characterized by making the quantity of light of the light emitting device of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 69 micrometers or more increase from the quantity of light of light emitting devices other than this edge by 4% with the force current value of said light emitting device.

[Claim 8] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips makes the quantity of light of the edge of said chip in 66-micrometer or more part where it is less than 69 micrometers, and the light emitting device of the near increase from the quantity of light of light emitting devices other than this edge and its near by 2% with the force current value of said light emitting device. Equipment write-in [optical] characterized by making the quantity of light of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 69 micrometers or more, and the light emitting device of the near increase from the quantity of light of light emitting devices other than this edge and its near by 4% with the force current value of said light emitting device.

[Claim 9] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips makes the quantity of light of said light emitting device increase gradually towards the edge of said chip in 66-micrometer or more part where it is less than 69 micrometers. While making the quantity of light of said light emitting device in this edge increase by 2% with the force current value of said light emitting device compared with the quantity of light of said light emitting device in the interior of said chip The quantity of light of said light emitting device is made to increase gradually towards the edge of said chip to kick. the parts whose light emitting device pitches of the joint section of two or more of said chips are 69 micrometers or more -- Equipment write-in [optical] characterized by making the quantity of light of the light emitting device of this edge increase from the quantity of light of said light emitting device in the interior of said chip by 4% with the force current value of said light emitting device.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the equipment write-in [optical] used for a copying machine, facsimile, a printer, etc.
[0002]
[Description of the Prior Art] Equipment write-in [optical] is used for a copying machine, facsimile, a printer, etc., and is performing optical writing to the photo conductor based on image data by solid-state scan type light print heads, such as an LED head. An LED head considers the LED array which arranged two or more LED components 1 to the single tier as one chip 2, as shown in drawing 8 , and it has the composition of having arranged two or more chips 2 to the Maine substrate 3 at the single tier.
[0003] However, the present condition is that, as for the pitch of the LED component 1 in the joint section of each chip 2, tolerance becomes large according to the problem on a facility etc. with this LED head to the ability to manufacture the pitch of each LED component 1 in a chip 2 with a sufficient precision. That is, the LED component pitch during each chip 2 will become large rather than the LED component pitch of the chip 2 interior.
[0004] If it says about the LED head of A zero-piece 400dpi, 113 chips 2 are mounted on the substrate 3 by considering the array of 128 LED components 1 as one chip 2. That is, an LED head consists of arrays of the 128x113=14464 piece LED component 1. Moreover, the pitch of each LED component 1 is 25.4mm/400=63.5micrometer. As shown in drawing 9 , in the production process of an LED head, the tolerance of the pitch of each LED component 1 is 63.5**10 micrometers in 63.5**5 micrometers and the joint part of each chip 2 inside a chip 2 from a facility.
[0005] With the equipment write-in [optical] which performs the optical writing of a halftone image with an LED head by the image data of a multiple value, the luminescence duty (luminescence time amount) of the LED component 1 was controlled by image data, and the halftone of an image was expressed. However, if luminescence duty of the LED component 1 is made small, as shown in drawing 10 , the path of the spot on the photo conductor by the flux of light from the LED component 1 will become small, and a white stripe will generate an image into the part corresponding to the joint section of each chip 2 from the pitch of the LED component 1 in the joint section of each chip 2 being large as mentioned above. So, with conventional equipment write-in [optical], the pitch of the LED component 1 in the joint section of each chip 2 of an LED head was somewhat made small to the pitch of each LED component 1 other than the joint section of each chip 2, and the occurrence frequency of a white stripe has been lowered.
[0006]
[Problem(s) to be Solved by the Invention] With conventional equipment write-in [optical], although the pitch of the LED component 1 in the joint section of each chip 2 of an LED head was made smaller than the pitch of an aim, since the tolerance was large, it is as hard as possible to lower the occurrence frequency of a white stripe, and it was not able to abolish generating of a white stripe.
[0007] That is, most will be done in + side to **10-micrometer tolerance, and a white stripe will

generate the dimension of the LED component pitch in the joint part of each chip 2 for an image into the part of the halftone corresponding to the part where the LED component pitch in an LED head is large. This cure against a white stripe foresees that an LED component pitch spreads the LED component pitch in the joint part of each chip 2 from the beginning like 63.5 to 61.5 micrometers of an aim, and is narrowed. However, as this cure against a white stripe, the rate of variable power of a main scanning direction becomes small, and does not become 100%. Moreover, it is as hard as possible that the tolerance of the LED component pitch in the joint part of each chip 2 is impossible for deleting a white stripe completely for a certain reason, and reduces white stripe occurrence frequency by no less than **10 micrometers.

[0008] This invention aims at offering the equipment write-in [optical] which can cancel generating of the white stripe by the chip joint section of an optical print head.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention concerning claim 1 considers the array of two or more light emitting devices as one chip, and makes the quantity of light of the light emitting device of the edge of said chip increase from the quantity of light of light emitting devices other than this edge by 2 to 6% with the force current value of said light emitting device in the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips arranged by the single tier.

[0010] Invention concerning claim 2 considers the array of two or more light emitting devices as one chip, and makes the quantity of light of the edge of said chip, and the light emitting device of the near increase from the quantity of light of light emitting devices other than this edge and its near by 2 to 6% with the force current value of said light emitting device in the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips arranged by the single tier.

[0011] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which invention concerning claim 3 considered the array of two or more light emitting devices as one chip, and were arranged by the single tier Turn the quantity of light of said light emitting device of said chip to the edge of said chip, it is made to increase gradually, and the quantity of light of said light emitting device in this edge is made to increase by 2 to 6% with the force current value of said light emitting device compared with the quantity of light of said light emitting device in the interior of said chip.

[0012] Invention concerning claim 4 considers the array of two or more light emitting devices as one chip, and makes the quantity of light of the light emitting device of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 66 micrometers or more increase from the quantity of light of light emitting devices other than this edge by 2 to 6% with the force current value of said light emitting device in the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips arranged by the single tier.

[0013] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which invention concerning claim 5 considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The quantity of light of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 66 micrometers or more, and the light emitting device of the near is made to increase from the quantity of light of light emitting devices other than this edge and its near by 2 to 6% with the force current value of said light emitting device.

[0014] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which invention concerning claim 6 considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The quantity of light of said light emitting device is made to increase gradually towards the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 66 micrometers or more. The quantity of light of said light emitting device in this edge is made to increase by 2 to 6% with

the force current value of said light emitting device compared with the quantity of light of said light emitting device in the interior of said chip.
[0015] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which invention concerning claim 7 considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips makes the quantity of light of the light emitting device of the edge of said chip in 66-micrometer or more part where it is less than 69 micrometers increase from the quantity of light of light emitting devices other than this edge by 2% with the force current value of said light emitting device. The quantity of light of the light emitting device of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 69 micrometers or more is made to increase from the quantity of light of light emitting devices other than this edge by 4% with the force current value of said light emitting device.
[0016] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which invention concerning claim 8 considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips makes the quantity of light of the edge of said chip in 66-micrometer or more part where it is less than 69 micrometers, and the light emitting device of the near increase from the quantity of light of light emitting devices other than this edge and its near by 2% with the force current value of said light emitting device. The quantity of light of the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 69 micrometers or more, and the light emitting device of the near is made to increase from the quantity of light of light emitting devices other than this edge and its near by 4% with the force current value of said light emitting device.
[0017] In the equipment write-in [optical] which performs optical writing by the solid-state scan type light print head which has two or more chips which invention concerning claim 9 considered the array of two or more light emitting devices as one chip, and were arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips makes the quantity of light of said light emitting device increase gradually towards the edge of said chip in 66-micrometer or more part where it is less than 69 micrometers. While making the quantity of light of said light emitting device in this edge increase by 2% with the force current value of said light emitting device compared with the quantity of light of said light emitting device in the interior of said chip The quantity of light of said light emitting device is made to increase gradually towards the edge of said chip in the part whose light emitting device pitch of the joint section of two or more of said chips is 69 micrometers or more. The quantity of light of the light emitting device of this edge is made to increase from the quantity of light of said light emitting device in the interior of said chip by 4% with the force current value of said light emitting device.
[0018]
[Embodiment of the Invention] The example 1 of this invention is one example of invention concerning claim 1, and is an example of the equipment write-in [optical] which is used for a copying machine, facsimile, a printer, etc. and performs optical writing to a photo conductor based on image data by the LED head as a solid-state scan type light print head. An LED head considers the LED array which arranged the LED component 11 as two or more light emitting devices to the single tier as one chip 12, as shown in drawing 1 , and it has the composition of having arranged two or more such chips 12 to the Maine substrate 13 at the single tier so that the LED component 11 might be arranged by the single tier to a main scanning direction. This LED head considers the array of 128 LED components 11 as one chip 12, 113 chips 12 are mounted on a substrate 13, and the pitch of each LED component 11 is 63.5 micrometers.
[0019] As shown in drawing 5 , it drives and the array 16 of the LED component 11 of each chip 12 in this LED head emits light so that the luminescence duty (luminescence time amount) of the LED component 11 may be controlled by the driver 15 by the image data of a multiple value, it irradiates the flux of light modulated by the image data of a multiple value to the uniform electrification side of a

photo conductor, and writes a halftone image in a photo conductor. The driver 15 is contained in the Maine substrate 13.
[0020] In the equipment of this example 1 write-in [optical], the path of the spot on the photo conductor by the flux of light from each LED component 11 of an LED head from it being proportional to the amount of luminescence of each LED component 11 If the LED pitch of an LED head enlarges the amount of luminescence of the LED component 11 of a large part (joint part of each chip) compared with the amount of luminescence of other LED components 11 As shown in drawing 6 , the path of the spot S1 on the photo conductor by the flux of light from the LED component of the part (joint part of each chip) where the LED pitch of an LED head is large becomes large compared with the path of the spot S2 on the photo conductor by the flux of light from other LED components. It is possible to crush the clearance between each spots S1 and S2 on a photo conductor.
[0021] Then, in order to delete the white stripe generated by the joint part of each chip 12 in the example 1, By making the value of the current impressed from a driver 15 increase to the LED component 11 of only both ends by 2 to 6% compared with the value of the current by which it is impressed from a driver 15 in all the chips 12 to LED components 11 other than LED component 11 of both ends, as shown in drawing 2 By raising the amount P1 of luminescence of the LED component 11 of both ends 2 to 6% compared with the amount P2 of luminescence of LED components 11 other than LED component 11 of both ends So that the path of the spot on the photo conductor by the flux of light from the LED component 11 of both ends may be made larger than the path of the spot on the photo conductor by the flux of light from LED components 11 other than LED of both ends and generating of a white stripe may be prevented The drive current from the driver 15 to each LED component 11 of an LED head was set up. The drive current from a driver 15 to LED components 11 other than LED component 11 of the both ends of each chip 12 was set up here at constant value.
[0022] As for a setup of the drive current from the driver 15 to the LED component 11, a well-known current adjustment means is used here. For example, a substrate 13 has the current adjustment means of the common knowledge which adjusts the drive current from the driver 15 to each LED component 11 of an LED head according to an individual according to the signal level of each input terminal, and adjusts the signal level of each input terminal of this current adjustment means. It adjusted so that the value of the current impressed from a driver 15 might be made to increase to the LED component 11 of only both ends by 2 to 6% compared with the value of the current by which it is impressed from a driver 15 in each chip 12 to LED components 11 other than LED component 11 of both ends.
[0023] The reason for having raised the force current value to the LED component 11 of both ends 2 to 6% When the force current value to the LED component 11 of both ends is made larger than 6%, drawing 7 Since the amount of [of the spot S1 on the photo conductor by the flux of light from the LED component 11 of both ends] intersection becomes large so that it may be shown, and the quantity of light becomes large, It is from a black stripe occurring in an image (the potential on a photo conductor will fall beyond the value of an aim), and is because a white stripe is not deleted for less than 2% ****** in the force current value to the LED component 11 of both ends, either.
[0024] According to this example 1, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier Since the quantity of light of the light emitting device 11 of the edge of said chip 12 was made to increase from the quantity of light of light emitting devices 11 other than this edge by 2 to 6% with the force current value of said light emitting device 11, generating of the white stripe by the chip joint section of the LED head as an optical print head is cancelable.
[0025] The example 2 of this invention is one example of invention concerning claim 2. In order to lose the concentration nonuniformity by local increment in the quantity of light only like the both ends of a chip 12 in the above-mentioned example 1 in this example 2, As shown in drawing 3 By making the value of the current impressed from a driver 15 increase to the LED component 11 of only both ends and near of those by 2 to 6% compared with the value of the current by which it is impressed from a driver 15 in all the chips 12 to LED components 11 other than LED component 11 of both ends and near of

those By raising the amount P1 of luminescence of the LED component 11 of both ends and near of those 2 to 6% compared with the amount P2 of luminescence of LED components 11 other than LED component 11 of both ends and near of those So that the path of the spot on the photo conductor by the flux of light from the LED component 11 of both ends and near of those may be made larger than the path of the spot on the photo conductor by the flux of light from LED components 11 other than LED component 11 of both ends and near of those The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0026] According to this example 2, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier Since the quantity of light of the edge of said chip 12 and the light emitting device 11 of the near was made to increase from the quantity of light of light emitting devices 11 other than this edge and its near by 2 to 6% with the force current value of said light emitting device 11 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, and the concentration nonuniformity by the still more nearly local increment in the quantity of light can be lost.

[0027] The example 3 of this invention is one example of invention concerning claim 3. In order to lose the concentration nonuniformity by local increment in the quantity of light only like the both ends of a chip 12 in the above-mentioned example 1 in this example 3, Turn to both ends the value of the current impressed from a driver 15, and it is made to increase to the LED component 11 gradually in all the chips 12, as shown in drawing 4 . By making the value of the current impressed from a driver 15 increase to the LED component 11 of both ends by 2 to 6% compared with the value of the current by which it is impressed from a driver 15 to the middle LED component 11 (LED to which a force current value is not made to increase) of a chip 12 The amounts P1, P2, and P3 of luminescence of the LED component 11 are made to increase gradually towards both ends. So that the amount of luminescence of the LED component 11 of both ends may be raised 2 to 6% compared with the amount P2 of luminescence of the middle LED component 11 (LED to which a force current value is not made to increase) of a chip 12 The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0028] According to this example 3, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier Turn the quantity of light of said light emitting device 11 of said chip 12 to the edge of said chip 12, and it is made to increase gradually. Since the quantity of light of said light emitting device 11 in this edge was made to increase by 2 to 6% with the force current value of said light emitting device 11 compared with the quantity of light of said light emitting device 11 in the interior of said chip 12 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, and the concentration nonuniformity by the still more nearly local increment in the quantity of light can be lost.

[0029] In the above-mentioned example 1 - the example 3, even if it raised the amount of luminescence of the LED component 11 in the joint part of each chip 12 with the force current value 2 to 6%, it was checked that a black stripe occurs only in the part whose LED pitch is 66 micrometers or more. so, in the example 4 of this invention which is one example of invention concerning claim 4 In order to prevent generating of a black stripe in the above-mentioned example 1, Into the joint part of each chip 12 When the LED pitch which can be set makes the value of the current impressed from a driver 15 increase to the LED component 11 in the edge of the chip 12 of a certain part by 2 to 6% compared with the value of the current by which it is impressed from a driver 15 to LED components 11 other than LED component 11 of this edge by 66 micrometers or more So that an LED pitch may raise the 66 micrometers or more of the amounts P1 of luminescence of the LED component 11 of the edge of the chip 12 in a certain part 2 to 6% compared with the amount P2 of luminescence of LED components 11 other than LED

component 11 of this edge The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0030] According to this example 4, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier Since the quantity of light of the light emitting device 11 of the edge of said chip 12 in the part whose light emitting device pitch of the joint section of two or more of said chips 12 is 66 micrometers or more was made to increase from the quantity of light of light emitting devices 11 other than this edge by 2 to 6% with the force current value of said light emitting device 11 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, and generating of a black stripe can be prevented further.

[0031] In the example 5 of this invention which is one example of invention concerning claim 5 In order to prevent generating of a black stripe in the above-mentioned example 2, Into the joint part of each chip 12 The LED pitch which can be set By making the value of the current impressed from a driver 15 increase to the LED component 11 in the edge of the chip 12 of a certain part, and its near by 2 to 6% compared with the value of the current by which it is impressed from a driver 15 to this edge and LED components 11 other than LED of the near by 66 micrometers or more So that an LED pitch may raise the 66 micrometers or more of the amounts P1 of luminescence of the edge of the chip 12 in a certain part, and the LED component 11 of the near 2 to 6% compared with the amount P2 of luminescence of this edge and LED components 11 other than LED component 11 of the near The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0032] According to this example 5, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier Since the quantity of light of the edge of said chip 12 in the part whose light emitting device pitch of the joint section of two or more of said chips 12 is 66 micrometers or more, and the light emitting device 11 of the near was made to increase from the quantity of light of light emitting devices 11 other than this edge and its near by 2 to 6% with the force current value of said light emitting device 11 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and generating of a black stripe can be prevented further.

[0033] In the example 6 of this invention which is one example of invention concerning claim 6 In order to prevent generating of a black stripe, the value of the current to which 66 micrometers or more of LED pitches in the joint part of each chip 12 are impressed from a driver 15 towards the edge of the chip 12 in a certain part to the LED component 11 of this chip 12 is made to increase gradually in the above-mentioned example 3. By making the value of the current impressed from a driver 15 increase to the LED component 11 of this edge by 2 to 6% compared with the value of the current by which it is impressed from a driver 15 to the middle LED component 11 (LED to which a current value is not made to increase) of a chip 12 An LED pitch makes the amount of luminescence of the LED component 11 of this chip 12 increase by gradually towards the edge of the chip 12 in a certain part by 66 micrometers or more. So that the amount P1 of luminescence of the LED component 11 of this edge may be raised 2 to 6% compared with the amount P2 of luminescence of the middle LED component 11 (LED to which a current value is not made to increase) of a chip 12 The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0034] According to this example 6, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier The quantity of light of said light emitting device 11 is made to increase gradually

towards the edge of said chip 12 in the part whose light emitting device pitch of the joint section of two or more of said chips 12 is 66 micrometers or more. Since the quantity of light of said light emitting device 11 in this edge was made to increase by 2 to 6% with the force current value of said light emitting device 11 compared with the quantity of light of said light emitting device 11 in the interior of said chip 12 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and generating of a black stripe can be prevented further.

[0035] In the example 7 of this invention which is one example of invention concerning claim 7 In the above-mentioned example 1, the LED pitch in the joint part of each chip 12 which a white stripe generates sets 66 micrometers or more in a certain part. Furthermore, the LED pitch in the joint part of each chip 12 is decomposed finely. A white stripe occurs slightly. While making the quantity of light of the LED component 11 of the edge of the chip 12 in the part whose LED pitch in the joint part of each chip 12 is 66 micrometers to less than 69 micrometers increase from the quantity of light of LED components 11 other than LED component 11 of this edge by 2% with the force current value of the LED component 11 A white stripe is conspicuous. Into the joint part of each chip 12 So that the quantity of light of the LED component 11 of the edge of the chip 12 in the part whose LED pitch which can be set is 69 micrometers or more may be made to increase from the quantity of light of LED components 11 other than LED component 11 of this edge by 4% with the force current value of the LED component 11 The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0036] According to this example 7, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips 12 makes the quantity of light of the light emitting device 11 of the edge of said chip 12 in 66-micrometer or more part where it is less than 69 micrometers increase from the quantity of light of light emitting devices 11 other than this edge by 2% with the force current value of said light emitting device 11. Since the quantity of light of the light emitting device 11 of the edge of said chip 12 in the part whose light emitting device pitch of the joint section of two or more of said chips 12 is 69 micrometers or more was made to increase from the quantity of light of light emitting devices 11 other than this edge by 4% with the force current value of said light emitting device 11 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, and an image with more little concentration nonuniformity can be offered.

[0037] In the example 8 of this invention which is one example of invention concerning claim 8 In the part whose LED pitch in the joint part of each chip 12 which a white stripe generates like an example 7 in the above-mentioned example 2 is 66 micrometers or more Decompose finely the LED pitch in the joint part of each chip 12, and a white stripe occurs slightly. Into the joint part of each chip 12 While making the quantity of light of the edge of the chip 12 in the part whose LED pitch which can be set is 66 micrometers to less than 69 micrometers, and the LED component 11 of the near increase from the quantity of light of this edge and LED components 11 other than LED component 11 of the near by 2% with the force current value of the LED component 11 A white stripe is conspicuous. Into the joint part of each chip 12 The LED pitch which can be set So that the quantity of light of the edge of the chip 12 in the part which is 69 micrometers or more, and the LED component 11 of the near may be made to increase from the quantity of light of this edge and LED components 11 other than LED component 11 of the near by 4% with the force current value of the LED component 11 The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0038] According to this example 8, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips 12 makes

the quantity of light of the edge of said chip 12 in 66-micrometer or more part where it is less than 69 micrometers, and the light emitting device 12 of the near increase from the quantity of light of light emitting devices 12 other than this edge and its near by 2% with the force current value of said light emitting device 12. Since the quantity of light of the edge of said chip 12 in the part whose light emitting device pitch of the joint section of two or more of said chips 12 is 69 micrometers or more, and the light emitting device 11 of the near was made to increase from the quantity of light of light emitting devices 11 other than this edge and its near by 4% with the force current value of said light emitting device 11 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and an image with more little concentration nonuniformity can be offered.

[0039] In the example 9 of this invention which is one example of invention concerning claim 9 In the above-mentioned example 3, the LED pitch in the joint part of each chip 12 which a white stripe generates like an example 7 sets 66 micrometers or more in a certain part. Furthermore, the LED pitch in the joint part of each chip 12 is decomposed finely. The quantity of light of the LED component 11 in this chip 12 is made to increase gradually towards the edge of the chip 12 in the part whose LED pitch in the joint part of each chip 12 which a white stripe generates slightly is 66 micrometers to less than 69 micrometers. While making the quantity of light of the LED component 11 in this edge increase by 2% with the force current value of the LED component 11 compared with the quantity of light of the LED component 11 (LED which is not ****** about the quantity of light) in the interior of a chip 12 The quantity of light of the LED component 11 in this chip 12 is made to increase gradually towards the edge of the chip 12 in the part whose LED pitch in the joint part of each chip 12 is 69 micrometers or more at which a white stripe is conspicuous. So that the quantity of light of the LED component 11 in this edge may be made to increase by 4% with the force current value of the LED component 11 compared with the quantity of light of the LED component 11 (LED which is not ****** about the quantity of light) in the interior of a chip 12 The drive current from the driver 15 to each LED component 11 of an LED head was set up by signal level adjustment of each input terminal of the above-mentioned current adjustment means.

[0040] According to this example 9, the array of the LED component 11 as two or more light emitting devices is considered as one chip 12. In the equipment write-in [optical] which performs optical writing by the LED head as a solid-state scan type light print head which has two or more chips 12 arranged by the single tier The light emitting device pitch of the joint section of two or more of said chips 12 makes the quantity of light of said light emitting device 11 increase gradually towards the edge of said chip 12 in 66-micrometer or more part where it is less than 69 micrometers. While making the quantity of light of said light emitting device 11 increase by 2% with the force current value of said light emitting device 11 compared with the quantity of light of said light emitting device 11 in the interior of said chip 12 at this edge The quantity of light of said light emitting device 11 is made to increase gradually towards the edge of said chip 12 in the part whose light emitting device pitch of the joint section of two or more of said chips 12 is 69 micrometers or more. Since the quantity of light of the light emitting device 11 of this edge was made to increase from the quantity of light of said light emitting device 11 in the interior of said chip 12 by 4% with the force current value of said light emitting device 11 Generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and an image with more little concentration nonuniformity can be offered.

[0041] In addition, this invention is not limited to the above-mentioned example, and can be applied also to the equipment write-in [optical] which has solid-state scan type light print heads other than an LED head.

[0042]

[Effect of the Invention] According to invention which relates to claim 1 as mentioned above, generating of the white stripe by the chip joint section of an optical print head is cancelable. According to invention concerning claim 2, generating of the white stripe by the chip joint section of an optical print head can be canceled, and the concentration nonuniformity by the still more nearly local increment in the quantity

of light can be lost.
[0043] According to invention concerning claim 3, generating of the white stripe by the chip joint section of an optical print head can be canceled, and the concentration nonuniformity by the still more nearly local increment in the quantity of light can be lost. According to invention concerning claim 4, generating of the white stripe by the chip joint section of an optical print head can be canceled, and generating of a black stripe can be prevented further.
[0044] According to invention concerning claim 5, generating of the white stripe by the chip joint section of an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and generating of a black stripe can be prevented further. According to invention concerning claim 6, generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and generating of a black stripe can be prevented further.
[0045] According to invention concerning claim 7, generating of the white stripe by the chip joint section of an optical print head can be canceled, and an image with more little concentration nonuniformity can be offered. According to invention concerning claim 8, generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and an image with more little concentration nonuniformity can be offered.
[0046] According to invention concerning claim 9, generating of the white stripe by the chip joint section of the LED head as an optical print head can be canceled, moreover the concentration nonuniformity by the local increment in the quantity of light can be lost, and an image with more little concentration nonuniformity can be offered.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the schematic diagram showing the LED head of the example 1 of this invention.
[Drawing 2] It is drawing showing the relation between LED in this example 1, and its force current value.
[Drawing 3] It is drawing showing the relation between LED in the example 2 of this invention, and its force current value.
[Drawing 4] It is drawing showing the relation between LED in the example 3 of invention, and its force current value.
[Drawing 5] It is the block diagram showing the LED array and driver of the above-mentioned example 1.
[Drawing 6] It is drawing showing the spot on the photo conductor by the above-mentioned example 1.
[Drawing 7] It is drawing for explaining the above-mentioned example.
[Drawing 8] It is the schematic diagram showing the conventional LED head.
[Drawing 9] It is drawing showing the LED pitch of this LED head.
[Drawing 10] It is drawing for explaining the white stripe generated by the chip joint part of this LED head.
[Description of Notations]
11 LED
12 Chip
15 Driver

[Translation done.]